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(54) POWER-ASSISTED FOLDING KNIFE

(57) The present invention provides a power-assisted folding knife, including: a blade holder; a blade arranged in the blade holder; a handle rotatably connected to the blade holder; a locking mechanism for locking the blade holder in an unfolded position and/or a folded position; the power-assisted folding knife further includes a power-assisting mechanism connected to the blade holder and the handle, for providing assisting power when unfolding a power-assisted folding knife. The power-assisted folding knife in the present invention uses an assisting mechanism for providing assisting power when unfolding a folding knife, so as to facilitate easier unfolding of the folding knife and to allow single hand operation; the blade holder can be locked in an unfolded position and/or a folded position to ensure safe use of the power-assisted folding knife.

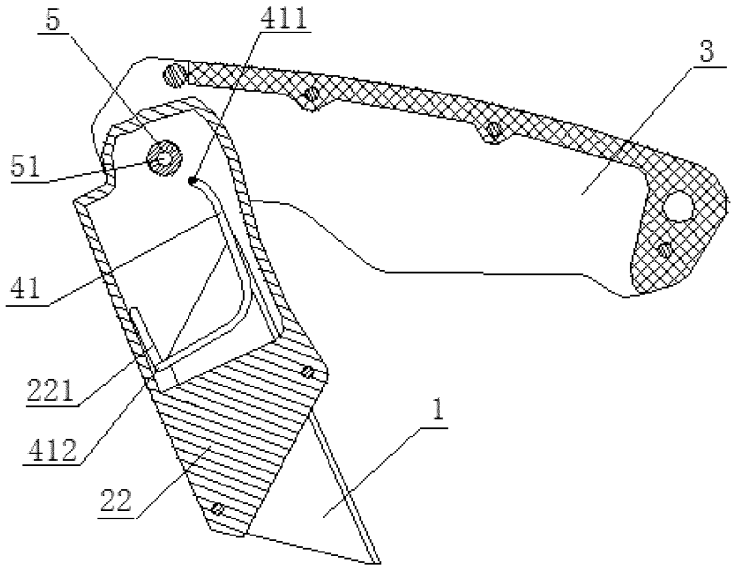

Fig. 4

EP 3 248 741 A1

Description

BACKGROUND

[0001] The invention relates to a hand tool, and particularly relates to a power-assisted folding knife.

[0002] A folding knife usually needs two hands to operate so as to be unfolded, and requires relatively large force.

[0003] The person skilled in the art endeavors to provide a power-assisted folding knife using an assisting mechanism so as to facilitate unfolding of the folding knife and to allow single hand operation.

SUMMARY OF THE INVENTION

[0004] It is an object of the invention to provide a power-assisted folding knife using an assisting mechanism, providing assisting power when unfolding a folding knife, so as to facilitate unfolding of the folding knife and to allow single hand operation. The power-assisted folding knife is provided with a locking mechanism, which can lock the blade holder in an unfolded position to ensure safe use of the folding knife.

[0005] The invention provides a power-assisted folding knife, which includes:

a blade holder;
a blade arranged in the blade holder;
a handle rotatably connected to the blade holder;
a locking mechanism for locking the blade holder in an unfolded position and/or a folded position;
characterized in that, the power-assisted folding knife further includes:

an assisting mechanism connected to the blade holder and the handle, for providing assisting power when unfolding a power-assisted folding knife.

[0006] Further, the assisting mechanism comprises steel wire.

[0007] Further, the blade holder comprises a first portion and a second portion, the steel wire is arranged between the first portion and the second portion.

[0008] Further, the first portion of the blade holder is arranged with a first arc-shaped slot, the axis of the first arc-shaped slot coinciding with a first rotation axis, the first rotation axis referring to a rotation axis of the blade holder and the handle, a first end of the steel wire is provided with a first curved part passing through the first arc-shaped slot and embedded in an aperture of the handle.

[0009] Further, one side of the second portion of the blade holder, which facing toward the blade, is arranged with a slot, a second end of the steel wire is provided with a second curved part embedded in the slot.

[0010] Further, during the unfolding process of the power-assisted folding knife, the torque produced by the elastic force of the steel wire enables the blade holder and the handle to rotate in a direction of unfolding after the second end of the steel wire passes over the extension line of the connection line of the first end and the first rotation axis, so as to provide assisting power for unfolding the power-assisted folding knife.

[0011] Further, during the folding process of the power-assisted folding knife, the torque produced by the elastic force of the steel wire enabling the blade holder and the handle to rotate in a direction of folding after the second end of the steel wire passes over the extension line of the connection line of the first end and the first rotation axis, so as to realize the self-lock of the power-assisted folding knife.

[0012] Further, the first portion and the second portion of the blade holder are integrated.

[0013] Further, the locking mechanism is a side lock or a back lock.

[0014] Further, the blade-mounting portion of the blade holder is integrated.

[0015] Further, the blade holder is arranged with a blade-pushing pin.

[0016] Further, the assisting mechanism comprises a tension spring or a pressure spring.

[0017] Further, the tension spring or the pressure spring is arranged in the handle.

[0018] Further, a first end of the tension spring or the pressure spring is arranged with a first hinge pin, a second end of the tension spring or the pressure spring is arranged with a second hinge pin.

[0019] Further, the handle is arranged with a second arc-shaped slot, the axis of the second arc-shaped slot coinciding with a first rotation axis, the first rotation axis referring to a rotation axis of the blade holder and the handle, the first hinge pin of the tension spring passing through the second arc-shaped slot and embedded in an aperture of the blade holder.

[0020] Further, the arc-shaped opening of the second arc-shaped slot turns away from the back of the blade of the power-assisted folding knife.

[0021] Further, the handle is arranged with a third arc-shaped slot, the axis of the third arc-shaped slot coinciding with a first rotation axis, the first rotation axis referring to a rotation axis of the blade holder and the handle, the first hinge pin of the pressure spring passing through the third arc-shaped slot and embedded in an aperture of the blade holder.

[0022] Further, the arc-shaped opening of the third arc-shaped slot turns toward the back of the blade of the power-assisted folding knife.

[0023] Further, the second hinge pin of the tension spring or the pressure spring is embedded in an aperture of the handle.

[0024] Further, the tension spring or the pressure spring is arranged in the blade holder.

[0025] Further, the locking mechanism is a side lock or a back lock.

[0026] Further, the assisting mechanism comprises a

torsion spring.

[0027] Further, the handle and the blade holder forms a rotatory connection by means of a third hinge pin, the torsion spring is sheathed on the third hinge pin.

[0028] Further, the torsion spring is arranged in an aperture of the handle.

[0029] Further, a first end of the torsion spring is embedded in a slot of the handle along the radial direction of the torsion spring.

[0030] Further, a second end of the torsion spring is embedded in an aperture of the blade holder along the direction parallel to the axial direction of the torsion spring.

[0031] Further, the torsion spring is arranged in an aperture of the blade holder.

[0032] Further, a first end of the torsion spring is embedded in an aperture of the handle along the direction parallel to the axial direction of the torsion spring.

[0033] Further, a second end of the torsion spring is fixed in an aperture of the blade holder.

[0034] Further, the locking mechanism comprises a push button, a spring and a push rod.

[0035] Further, the spring and the push rod are arranged in a slot of the handle.

[0036] Further, one end of the spring is sheathed on the push rod.

[0037] Further, the end of the blade holder connecting the handle is arranged with a protruding rim, the protruding rim comprising a first recess part and a second recess part.

[0038] Further, the push rod cooperates with the first recess part, locking the blade holder in the folded position.

[0039] Further, the push rod cooperates with the second recess part, locking the blade holder in the unfolded position.

[0040] Further, the push button moves in a direction distal from the third hinge pin, enabling the push rod to retreat from the second recess part.

[0041] The power-assisted folding knife provided by the invention has the following advantageous effects:

(1) Applying assisting mechanism to provide assisting power when unfolding the folding knife, to facilitate unfolding of the folding knife, and to enable single hand operation;

(2) Being able to lock the blade holder in the unfolded position and/or the folded position, to ensure safe use of the folding knife.

BRIEF DESCRIPTION OF THE DRAWINGS

[0042]

Figure 1 is a front view of a power-assisted folding knife in an embodiment of the invention;

Figure 2 is an exploded view of the power-assisted folding knife shown in Figure 1;

Figure 3 is a sectional view of the power-assisted folding knife shown in Figure 1 in a folded state;

Figure 4 is a sectional view of the power-assisted folding knife shown in Figure 1 in an unfolding or folding process;

Figure 5 is a sectional view of the power-assisted folding knife shown in Figure 1 in an unfolded state;

Figure 6 is a connection relation view of the steel wire of the power-assisted folding knife shown in Figure 1;

Figure 7 is a perspective view of a second portion of the blade holder of the power-assisted folding knife shown in Figure 1;

Figure 8 is a force analysis diagram of the power-assisted folding knife shown in Figure 1 providing a locking torque when folding;

Figure 9 is a force analysis diagram of the power-assisted folding knife shown in Figure 1 providing an unfolding torque when unfolding;

Figure 10 is a sectional view of a power-assisted folding knife in another embodiment of the invention in a folded state;

Figure 11 is a sectional view of the power-assisted folding knife shown in Figure 10 in an unfolding or folding process;

Figure 12 is a sectional view of the power-assisted folding knife shown in Figure 10 in an unfolded state;

Figure 13 is a sectional view of a power-assisted folding knife in a further embodiment of the invention in a folded state;

Figure 14 is a front view of the power-assisted folding knife in a further embodiment of the invention;

Figure 15 is a top sectional view of the power-assisted folding knife shown in Figure 14;

Figure 16 is a rear sectional view of the power-assisted folding knife shown in Figure 14;

Figure 17 is a sectional view of the power-assisted folding knife shown in Figure 14 with the locking mechanism locking the folded position;

Figure 18 is a sectional view of the power-assisted folding knife shown in Figure 14 with the locking mechanism locking the unfolded position;

Figure 19 is a sectional view of a power-assisted folding knife in a further embodiment of the invention in a folded state.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0043] Now the conception, detailed structure and the technical effect produced thereby of the invention will be further described in combination with the accompanying figures, so as to fully understand the object, features and effects of the invention.

[0044] As shown in Figures 1-9, a power-assisted folding knife in an embodiment of the invention includes:

a blade holder 2;

a blade 1 arranged in the blade holder 2;
a handle 3 rotatably connected to the blade holder 2;
a locking mechanism for locking the blade holder 2 in an unfolded position and/or a folded position;
the power-assisted folding knife further includes:

an assisting mechanism connected to the blade holder 2 and the handle 3, for providing assisting power when unfolding a power-assisted folding knife.

[0045] The power-assisted folding knife in this embodiment uses an assisting mechanism providing assisting power when unfolding a folding knife, so as to facilitate unfolding of the folding knife and to allow single hand operation. The power-assisted folding knife is provided with a locking mechanism, which can lock the blade holder in an unfolded position and/or a folded position to ensure safe use of the power-assisted folding knife.

[0046] In this embodiment, the blade holder 2 includes a first portion 21 and a second portion 22 that are oppositely arranged, and the blade 1 is arranged between the first portion 21 and the second portion 22.

[0047] The first portion 21 and the second portion 22 of the blade holder 2 may also be integrated or the portion of the blade holder 2 for mounting the blade may be integrated.

[0048] In this embodiment, the locking mechanism is a side lock 312, as shown in Figure 1, 6. The side lock 312 is an elastic leaf with one end connected to the handle 31. When the power-assisted folding knife is being unfolded, the side lock 312 pops up toward the inside of the handle 31. The other end of the side lock 312 prevents the blade holder 2 from rotating toward the handle 3, locking the blade holder 2 in the unfolded position. The inside of the handle 31 refers to the side of the handle 31 facing toward the blade holder 2.

[0049] When folding the power-assisted folding knife, pressing the side lock 312 toward the outside of the handle 31, the blade holder 2 then can rotate toward the handle 3.

[0050] The locking mechanism may also use other means of locking such as back lock etc. There are many prior arts regarding the structure for locking a blade holder, and we are not going into details herein.

[0051] The assisting mechanism includes an elastic member.

[0052] In this embodiment, the elastic member is steel wire which is arranged between the first portion 21 and the second portion 22 of the blade holder 2.

[0053] As shown in Figure 6, the first portion 21 of the blade holder 2 is arranged with a first arc-shaped slot 211. The axis of the arc-shaped slot 211 coincides with the rotation axis of the handle 3 and the blade holder 2. As shown in Figure 1, the handle 3 and the blade holder 2 forms a rotary connection by means of a hinge pin 5, and the rotation axis of the handle 3 and the blade holder 2 is the axis 51 of the hinge pin 5.

[0054] As shown in Figure 7, a slot 221 is arranged on the side facing toward the blade, of the second portion 22 of the blade holder 2.

[0055] As shown in Figures 6, 7, the elastic member is steel wire 41, the first end 411 of which is provided with a first curved part 4111 passing through the first arc-shaped slot 211 of the first portion 21 and embedded in an aperture 311 of the handle 31; the second end 412 of the steel wire 41 is provided with a second curved part 4121 embedded in the slot 221 of the second portion 22.

[0056] The power-assisted folding knife in this embodiment realizes the power-assisting function relying on the elastic force provided by steel wire 41, and the steel wire 41 is arranged in the blade holder 2 with one end fixed in the aperture 311 of the handle 31 and the other one end can move freely along the slot 221 on the second portion 22 of the blade holder 2.

[0057] As shown in Figure 8, when the power-assisted folding knife in this embodiment is being folded, the second end 412 of the steel wire 41 passes over the extension line of the connection line of the axis 51 of the hinge pin 5 and the first end 411 of the steel wire 41, and the elastic force produced by the steel wire 41 is F1 at the first end 411, and F2 at the second end 412, where F1 and F2 are on the connection line of the first end 411 and the second end 412 in opposite directions.

[0058] The component of F1 in the tangential direction is Fla, which acts on the handle 3 through the first curved part 4111, producing a torque enabling the handle 3 to rotate toward the blade holder 2, in the clockwise direction as shown in Figure 8;

[0059] The component of F2 in the tangential direction is F2a, which acts on the blade holder 2 through the second curved part 4121, producing a torque enabling the blade holder 2 to rotate toward the handle 3, in the counter clockwise direction as shown in Figure 8;

[0060] The torque produced by F1a enables the handle 3 to rotate toward the blade holder 2, and the torque produced by F2a enables the blade holder 2 to rotate toward the handle 3, that is, the torque produced by the elastic force of the steel wire enables the blade holder 2 and the handle 3 to rotate in a direction of folding, so as to realize self-lock of the power-assisted folding knife.

[0061] When the power-assisted folding knife in this embodiment is being unfolded, the blade-pushing pin 6 is pushed to overcome the self-lock force produced by the steel wire, as shown in Figure 1, providing the torque for rotating out the blade holder 2.

[0062] As shown in Figure 9, when the power-assisted folding knife in this embodiment is being unfolded, the second end 412 of the steel wire 41 passes over the extension line of the connection line of the axis 51 of the hinge pin 5 and the first end 411 of the steel wire 41, and F1a acts on the handle 3 through the first curved part 4111, where the torque produced enables the handle to rotate in a direction distal from the blade holder 2, in the counter clockwise direction as shown in Figure 9, and F2a acts on the blade holder 2 through the second curved

part 4121, where the torque produced enables the blade holder 2 to rotate in a direction distal from the handle 3, in the clockwise direction as shown in Figure 9, so as to provide assisting power for unfolding the folding knife, that is, the elastic force of the steel wire providing the torque for unfolding the power-assisted folding knife.

[0063] As shown in Figures 10-12, the power-assisted folding knife in another embodiment of the invention differs from the embodiment shown in Figure 1 in that: the elastic member is a tension spring 42; the tension spring 42 is arranged in the handle 3, and may also be arranged in the blade holder.

[0064] The handle 3 is arranged with a second arc-shaped slot 321, with the axis of the second arc-shaped slot 321 coinciding with the rotation axis of the handle 3 and the blade holder 2. The handle 3 and the blade holder 2 form a rotatory connection by means of a hinge pin 5, where the rotation axis of the handle 3 and the blade holder 2 is the axis of the hinge pin 5.

[0065] The first end 421 of the tension spring 42 is arranged with a first hinge pin passing through the second arc-shaped slot 321 and embedded in the aperture of the blade holder 2.

[0066] The second end 422 of the tension spring 42 is arranged with a second hinge pin embedded in the aperture of the handle 3.

[0067] As shown in Figure 10, the power-assisted folding knife is in the folded state, where the first end 421 of the tension spring 42 is in the position distal to the second end 422 in the second arc-shaped slot 321 and the tension spring 42 is in a stretched state, i.e. energy storing state.

[0068] Similar to the embodiment as shown in Figure 1, when the power-assisted folding knife is being folded, the second end 422 passes over the extension line of the connection line of the axis of the hinge pin 5 and the first end 421, and the torque produced by the elastic force of the tension spring 42 enables the blade holder 2 and the handle 3 to rotate in a direction of folding so as to realize self-lock; when the power-assisted folding knife is being unfolded, the second end 422 passes over the extension line of the connection line of the axis of the hinge pin 5 and the first end 421, and the torque produced by the elastic force of the tension spring 42 enables the blade 2 and the handle 3 to rotate in a direction of unfolding so as to provide assisting power for unfolding the power-assisted folding knife.

[0069] In this embodiment, the locking mechanism uses a side lock, and may also use a back lock, for locking the blade holder 2 in the unfolded position; as shown in Figure 10, the blade holder 2 is arranged with a blade-pushing pin 6 for providing torque for unfolding the power-assisted folding knife.

[0070] As shown in Figure 13, a power-assisted folding knife in a further embodiment of the invention differs from the power-assisted folding knife as shown in Figures 10-12 in that: the elastic member is a pressure spring 43, the direction of the third arc-shaped slot 331 is different from the direction of the second arc-shaped slot 321, the arc-shaped opening of the third arc-shaped slot 331 turning toward the back of the blade.

[0071] When the power-assisted folding knife is being folded, the second end 432 passes over the extension line of the connection line of the axis of the hinge pin 5 and the first end 431, and the torque produced by the elastic force of the pressure spring 43 enables and the blade holder 2 and the handle 3 to rotate in a direction of folding, so as to realize self-lock; when the power-assisted folding knife is being unfolded, the second end 432 passes over the extension line of the connection line of the axis of the hinge pin 5 and the first end 431, and the torque produced by the elastic force of the pressure spring 43 enables the blade holder 2 and the handle 3 to rotate in a direction of unfolding, so as to provide assisting power for unfolding the power-assisted folding knife.

[0072] When the power-assisted folding knife is in the folded state, the first end 431 of the pressure spring 43 is in a position proximal to the second end 432 of the pressure spring 43 in the third arc-shaped slot 331, and the pressure spring 43 is in the compressed state, i.e. energy storing state; when the power-assisted folding knife is being unfolded, the elastic force of the pressure spring 43 provides assisting power.

[0073] The pressure spring 43 may also be arranged in the blade holder.

[0074] A power-assisted folding knife in a further embodiment of the invention, as shown in Figures 14-18, differs from the embodiment shown in Figure 1 in that: the elastic member is a torsion spring 44 arranged in the aperture of the handle 3.

[0075] The handle 3 and the blade holder 2 forms a rotatory connection, and the torsion spring 44 is provided around the hinge pin 5, as shown in Figures 15, 16. The first end 441 of the torsion spring 44 is embedded in the slot of the handle 3 along the radial direction of the torsion spring 44; the second end 442 of the torsion spring 44 is embedded in the aperture of the blade holder 2 along the direction parallel with the axial direction of the torsion spring 44.

[0076] When folding the power-assisted folding knife in this embodiment, applying force to the torsion spring 44 to enable the torsion spring 44 to be in energy storing state; when unfolding the power-assisted folding knife, the elastic force of the torsion spring 44 provides assisting power.

[0077] The power-assisted folding knife in this embodiment also includes a locking mechanism including a push button 7, spring 71 and push rod 72. One end of the spring 71 is provided around the push rod 72, and the spring 71 and the push rod 72 are arranged in the slot of the handle 3, as shown in Figures 17, 18, the push button 7 is connected with the push rod 72.

[0078] The end of the blade holder 2, which is connected to the handle 3, is arranged with a protruding rim including a first recess part 23 and the second recess part

24.

[0079] When the power-assisted folding knife is in the folded position, the push rod 72 cooperates with the first recess part 23, locking the blade holder 2 in the folded position, as shown in Figure 17; when needing to unfold the power-assisted folding knife, pushing the blade-pushing pin 6, and under the torque provided by the blade-pushing pin 6, the push rod 72 slides out from the first recess 23 and then the power-assisted folding knife can be unfolded.

[0080] When the power-assisted folding knife is in the unfolded position, the push rod 72 cooperates with the second recess 24, locking the blade holder 2 in the unfolded position, as shown in Figure 18; when needing to fold the power-assisted folding knife, pushing the push button 7 toward the spring 71, enabling the push rod 72 to retreat from the second recess 24, then the power-assisted folding knife can be folded.

[0081] As shown in Figure 19, a power-assisted folding knife in a further embodiment of the invention differs from the embodiment shown in Figure 14 in that: the torsion spring 44 is arranged in the aperture of the blade holder 2.

[0082] The first end 441 of the torsion spring 44 is embedded in the aperture of the handle 3 along the direction parallel to the axial direction of the torsion spring 44.

[0083] The second end 442 of the torsion spring 44 is fixed in the aperture of the blade holder 2.

[0084] The invention provides a power-assisted folding knife using assisting mechanism, providing assisting power when unfolding the power-assisted folding knife, to facilitate unfolding of the folding knife and to allow single hand operation; the blade holder can be locked in an unfolded position and/or a folded position to ensure safe use of the power-assisted folding knife.

[0085] Various assisting mechanisms of the invention that are arranged in the handle may also be arranged in the blade holder.

[0086] The foregoing described the preferred embodiments of the present invention. It should be understood that an ordinary person skilled in the art can make many modifications and variations according to the concept of the present invention without creative work. Therefore, any technical solution obtained by a person skilled in the art according to the concept of the present invention through logical analyses, deductions and limited experiments should fall into the protection scope defined by the claims.

Claims

1. A power-assisted folding knife, comprising:

a blade holder;
a blade arranged in the blade holder;
a handle rotatably connected to the blade holder;
a locking mechanism for locking the blade holder in an unfolded position and/or a folded position;
characterized in that, the power-assisted folding knife further comprises:

an assisting mechanism connected to the blade holder and the handle, for providing assisting power when unfolding the power-assisted folding knife.

2. The power-assisted folding knife as claimed in Claim 1, **characterized in that**, the assisting mechanism comprises steel wire.

3. The power-assisted folding knife as claimed in Claim 2, **characterized in that**, the blade holder comprises a first portion and a second portion, the steel wire being arranged between the first portion and the second portion.

4. The power-assisted folding knife as claimed in Claim 3, **characterized in that**, the first portion of the blade holder is arranged with a first arc-shaped slot, the axis of the first arc-shaped slot coinciding with a first rotation axis, the first rotation axis referring to a rotation axis of the blade holder and the handle, a first end of the steel wire being provided with a first curved part passing through the first arc-shaped slot and embedded in an aperture of the handle.

5. The power-assisted folding knife as claimed in Claim 4, **characterized in that**, one side of the second portion of the blade holder, which faces toward the blade, is arranged with a slot, a second end of the steel wire being provided with a second curved part embedded in the slot.

6. The power-assisted folding knife as claimed in Claim 5, **characterized in that**, during the unfolding process of the power-assisted folding knife, the torque produced by the elastic force of the steel wire enables the blade holder and the handle to rotate in a direction of unfolding after the second end of the steel wire passes over the extension line of the connection line of the first end and the first rotation axis, so as to provide assisting power for unfolding the power-assisted folding knife.

7. The power-assisted folding knife as claimed in Claim 5, **characterized in that**, during the folding process of the power-assisted folding knife, the torque produced by the elastic force of the steel wire enables the blade holder and the handle to rotate in a direction of folding after the second end of the steel wire passes over the extension line of the connection line of the first end and the first rotation axis, so as to realize the self-lock of the power-assisted folding knife.

8. The power-assisted folding knife as claimed in Claim 3, **characterized in that**, the first portion and the second portion of the blade holder are integrated.

9. The power-assisted folding knife as claimed in Claim 2, **characterized in that**, the locking mechanism is a side lock or a back lock.

10. The power-assisted folding knife as claimed in Claim 1, **characterized in that**, the blade-mounting portion of the blade holder is integrated.

11. The power-assisted folding knife as claimed in Claim 1, **characterized in that**, the blade holder is arranged with a blade-pushing pin.

12. The power-assisted folding knife as claimed in Claim 1, **characterized in that**, the assisting mechanism comprises a tension spring or a pressure spring.

13. The power-assisted folding knife as claimed in Claim 12, **characterized in that**, the tension spring or the pressure spring is arranged in the handle.

14. The power-assisted folding knife as claimed in Claim 13, **characterized in that**, a first end of the tension spring or the pressure spring is arranged with a first hinge pin, a second end of the tension spring or the pressure spring being arranged with a second hinge pin.

15. The power-assisted folding knife as claimed in Claim 14, **characterized in that**, the handle is arranged with a second arc-shaped slot, the axis of the second arc-shaped slot coinciding with a first rotation axis, the first rotation axis referring to a rotation axis of the blade holder and the handle, the first hinge pin of the tension spring passing through the second arc-shaped slot and embedded in an aperture of the blade holder.

16. The power-assisted folding knife as claimed in Claim 15, **characterized in that**, the arc-shaped opening of the second arc-shaped slot turns away from the back of the blade of the power-assisted folding knife.

17. The power-assisted folding knife as claimed in Claim 14, **characterized in that**, the handle is arranged with a third arc-shaped slot, the axis of the third arc-shaped slot coinciding with a first rotation axis, the first rotation axis referring to a rotation axis of the blade holder and the handle, the first hinge pin of the pressure spring passing through the third arc-shaped slot and embedded in an aperture of the blade holder.

18. The power-assisted folding knife as claimed in Claim 17, **characterized in that**, the arc-shaped opening of the third arc-shaped slot turns toward the back of the blade of the power-assisted folding knife.

19. The power-assisted folding knife as claimed in Claim 14, **characterized in that**, the second hinge pin of the tension spring or the pressure spring is embedded in an aperture of the handle.

20. The power-assisted folding knife as claimed in Claim 12, **characterized in that**, the tension spring or the pressure spring is arranged in the blade holder.

21. The power-assisted folding knife as claimed in Claim 12, **characterized in that**, the locking mechanism is a side lock or a back lock.

22. The power-assisted folding knife as claimed in Claim 1, **characterized in that**, the assisting mechanism comprises a torsion spring.

23. The power-assisted folding knife as claimed in Claim 22, **characterized in that**, the handle and the blade holder forms a rotatory connection by means of a third hinge pin, the torsion spring being provided around the third hinge pin.

24. The power-assisted folding knife as claimed in Claim 23, **characterized in that**, the torsion spring is arranged in an aperture of the handle.

25. The power-assisted folding knife as claimed in Claim 24, **characterized in that**, a first end of the torsion spring is embedded in a slot of the handle along the radial direction of the torsion spring.

26. The power-assisted folding knife as claimed in Claim 25, **characterized in that**, a second end of the torsion spring is embedded in an aperture of the blade holder along the direction parallel to the axial direction of the torsion spring.

27. The power-assisted folding knife as claimed in Claim 23, **characterized in that**, the torsion spring is arranged in an aperture of the blade holder.

28. The power-assisted folding knife as claimed in Claim 27, **characterized in that**, a first end of the torsion spring is embedded in an aperture of the handle along the direction parallel to the axial direction of the torsion spring.

29. The power-assisted folding knife as claimed in Claim 28, **characterized in that**, a second end of the torsion spring is fixed in an aperture of the blade holder.

30. The power-assisted folding knife as claimed in Claim 22, **characterized in that**, the locking mechanism comprises a push button, a spring and a push rod.

31. The power-assisted folding knife as claimed in Claim 30, **characterized in that**, the spring and the push rod are arranged in a slot of the handle.

32. The power-assisted folding knife as claimed in Claim 31, **characterized in that**, one end of the spring is provided around the push rod.

33. The power-assisted folding knife as claimed in Claim 32, **characterized in that**, the end of the blade holder connecting to the handle is arranged with a protruding rim, the protruding rim comprising a first recess part and a second recess part.

34. The power-assisted folding knife as claimed in Claim 33, **characterized in that**, the push rod cooperates with the first recess part, locking the blade holder in the folded position.

35. The power-assisted folding knife as claimed in Claim 33, **characterized in that**, the push rod cooperates with the second recess part, locking the blade holder in the unfolded position.

36. The power-assisted folding knife as claimed in Claim 35, **characterized in that**, the push button moves in a direction distal from the third hinge pin, enabling the push rod to retreat from the second recess part.

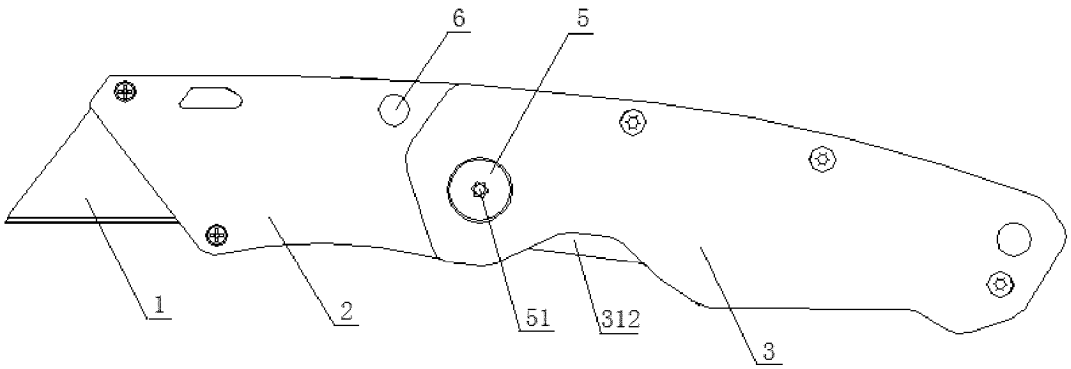

Fig. 1

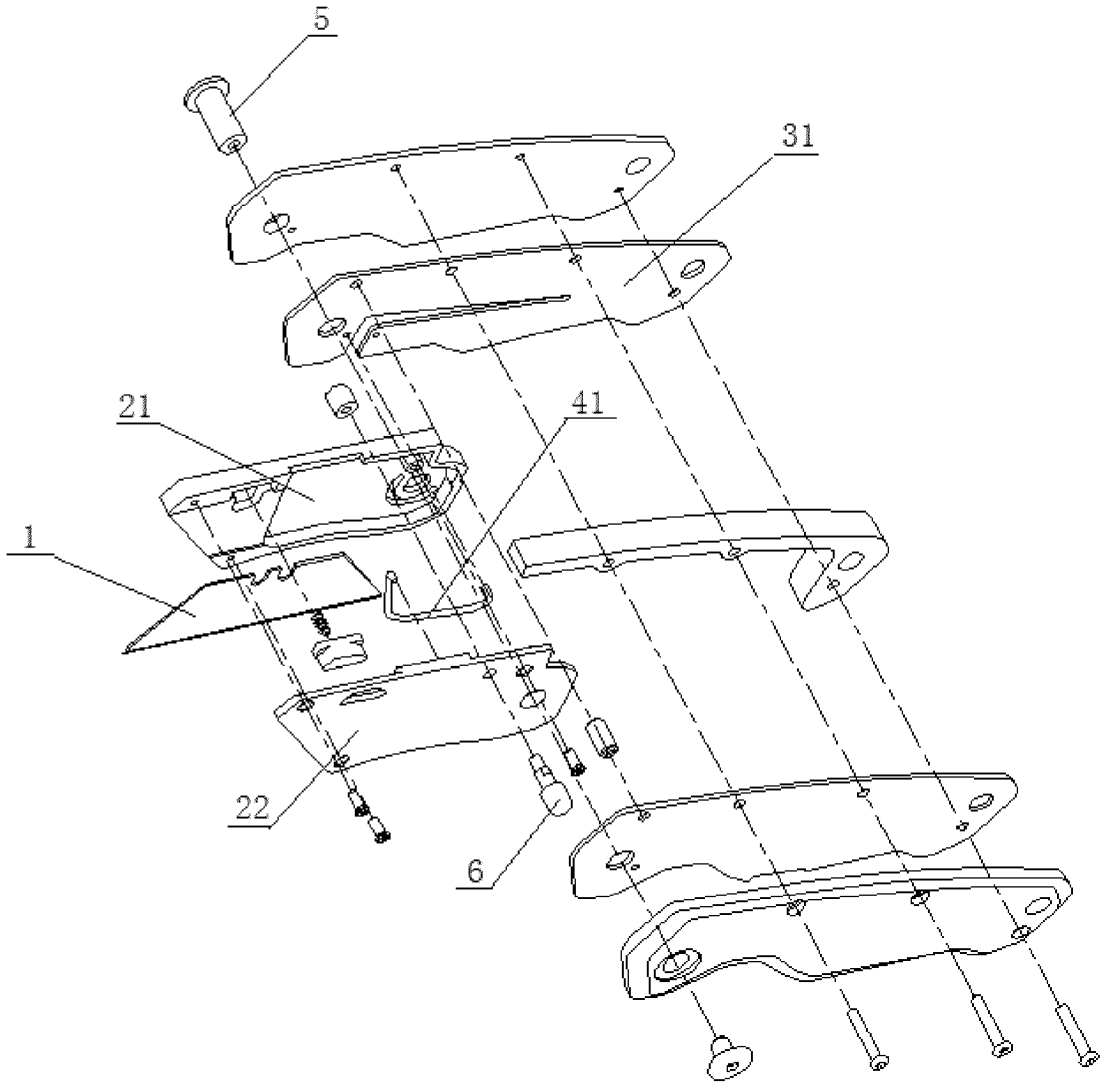

Fig. 2

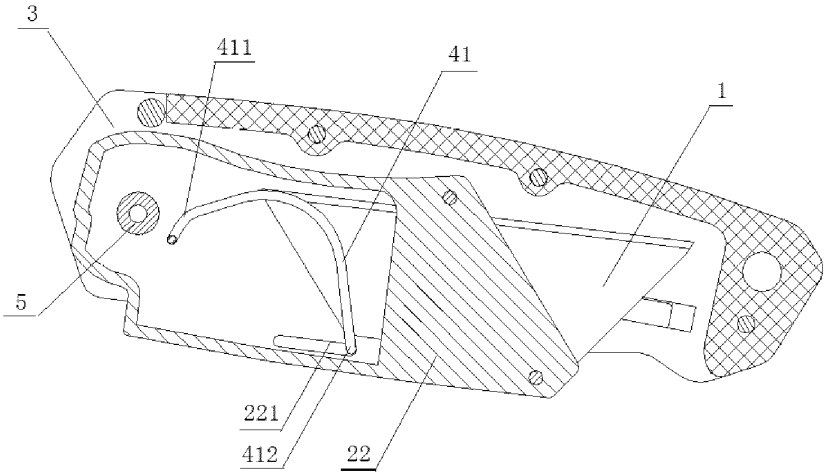

Fig. 3

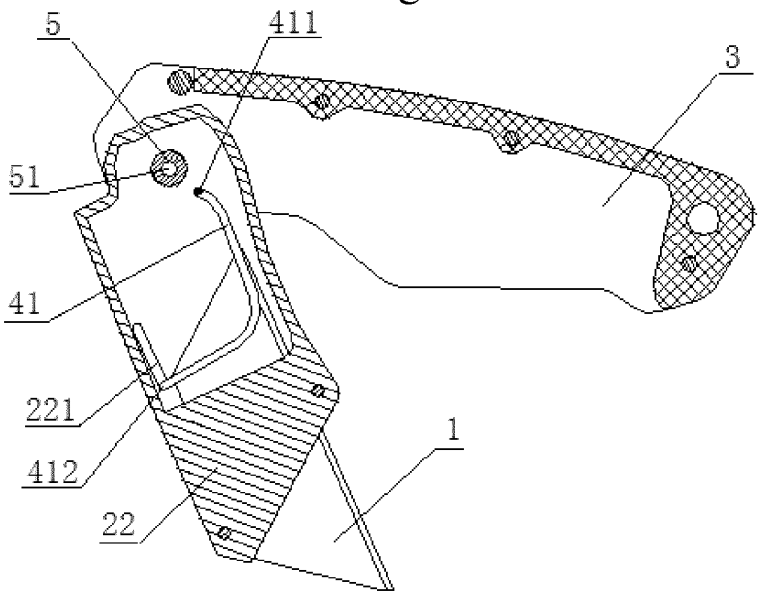

Fig. 4

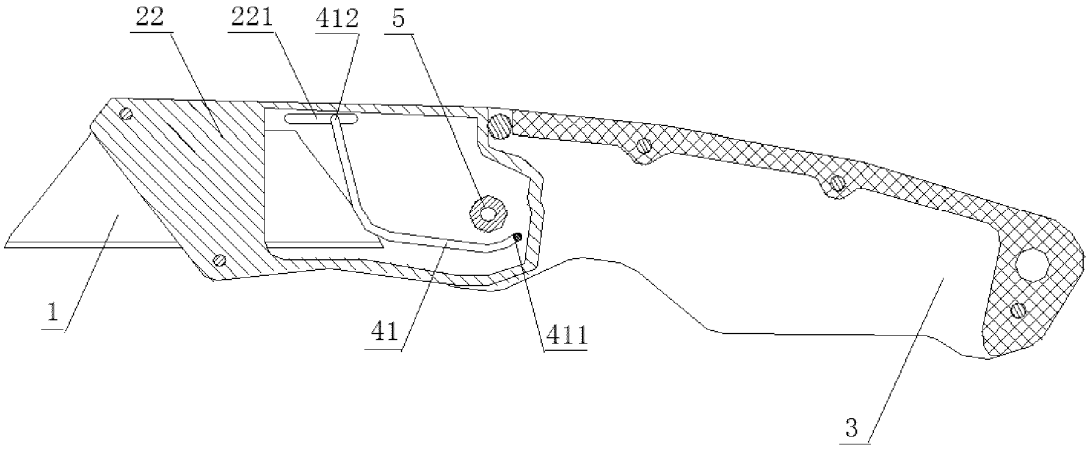

Fig. 5

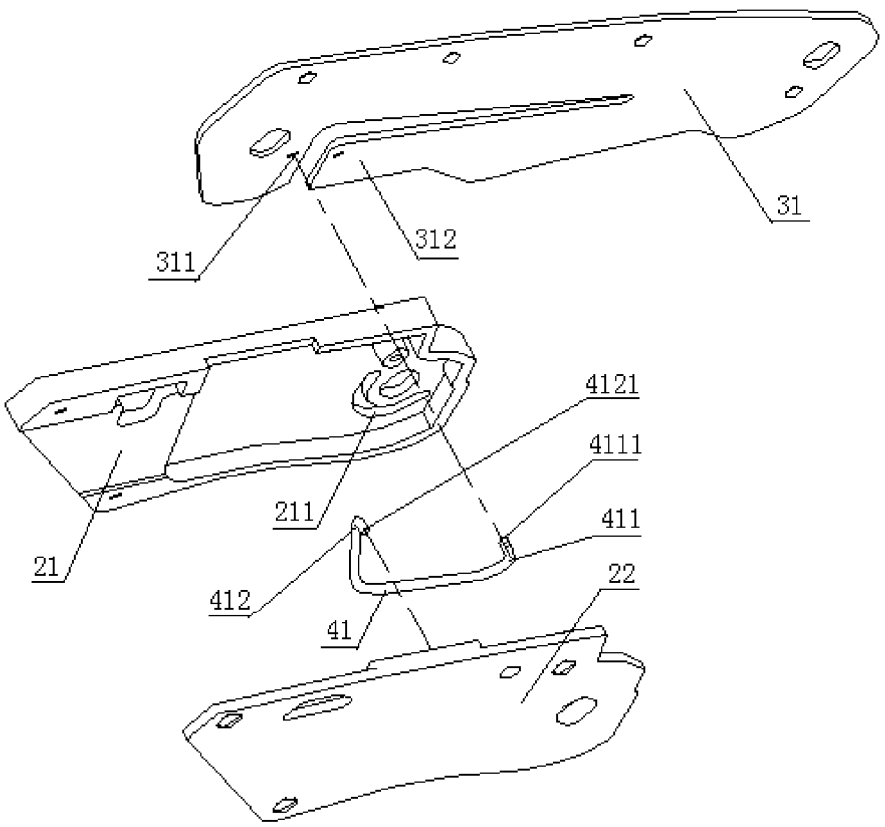

Fig. 6

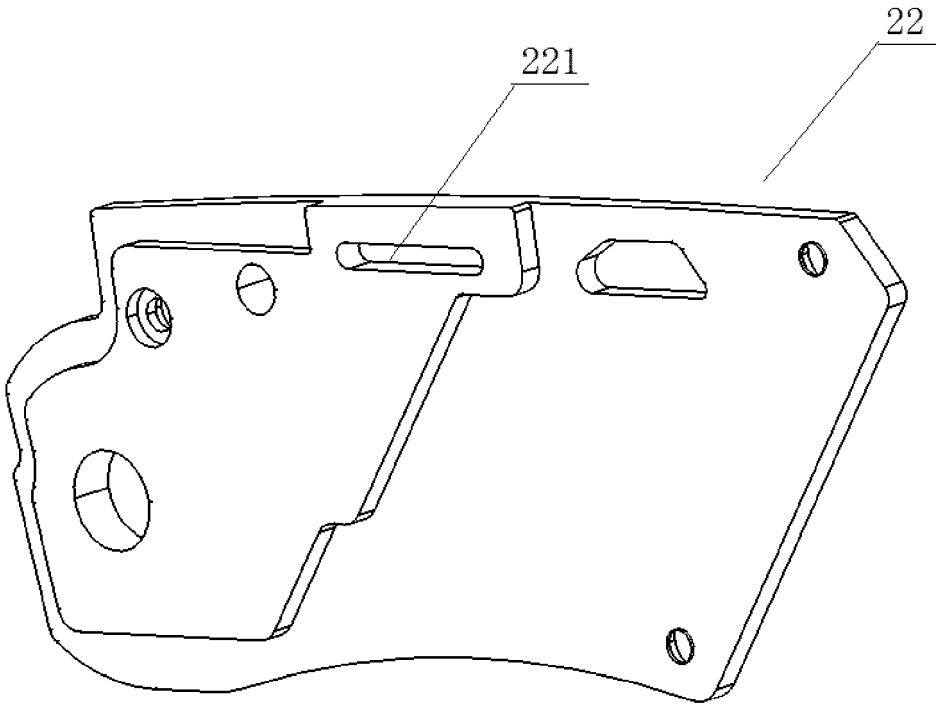

Fig. 7

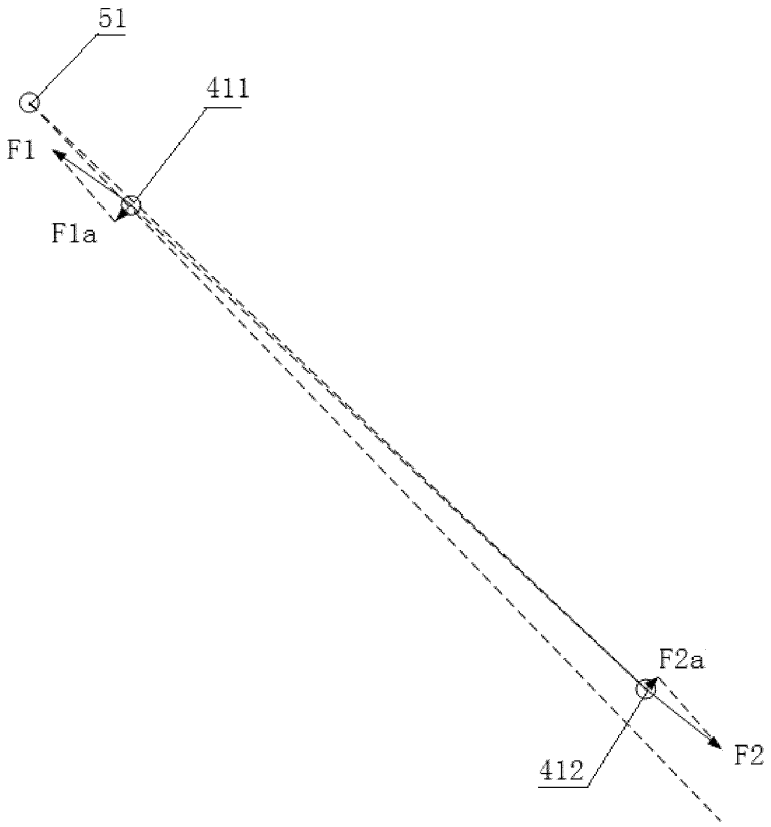

Fig. 8

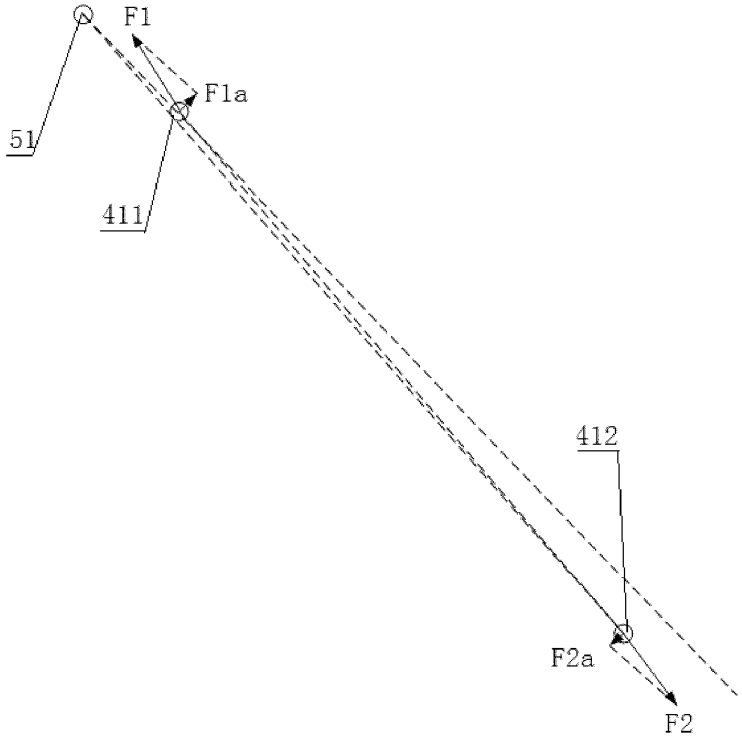

Fig. 9

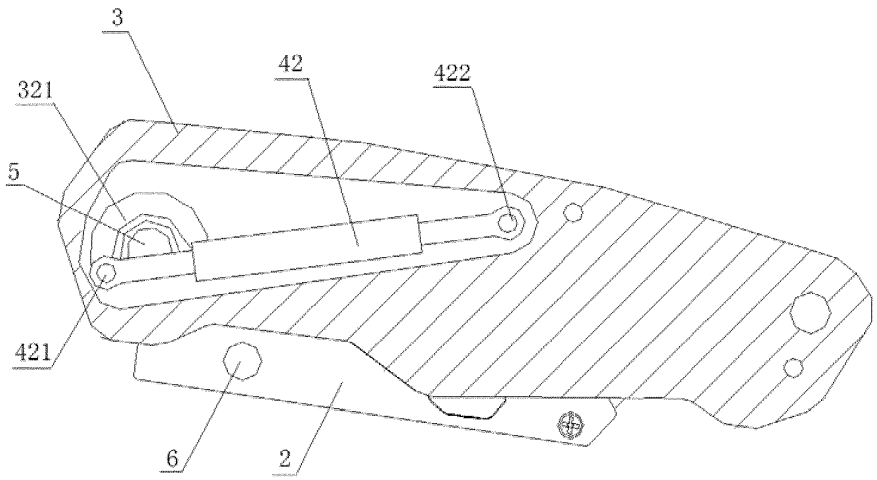

Fig. 10

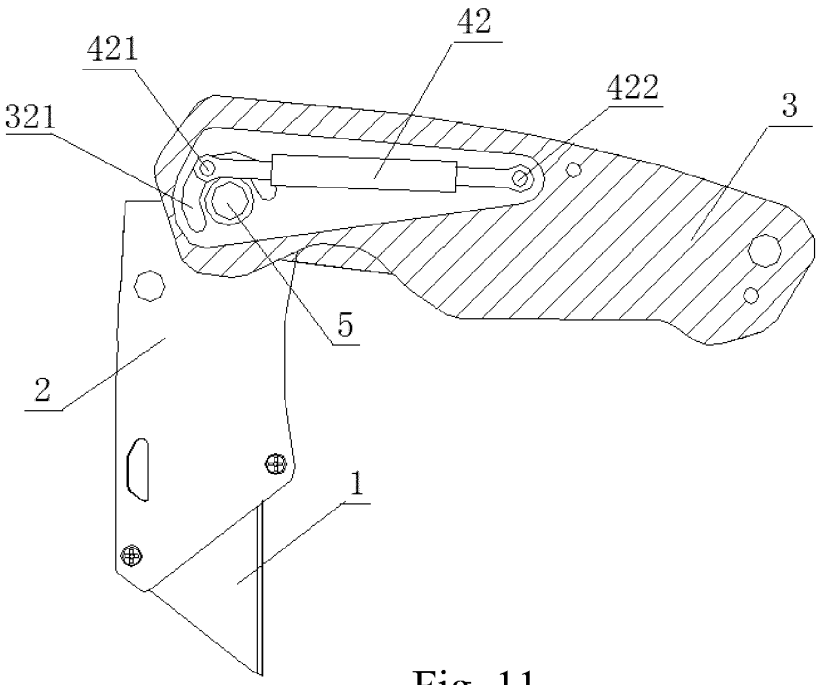

Fig. 11

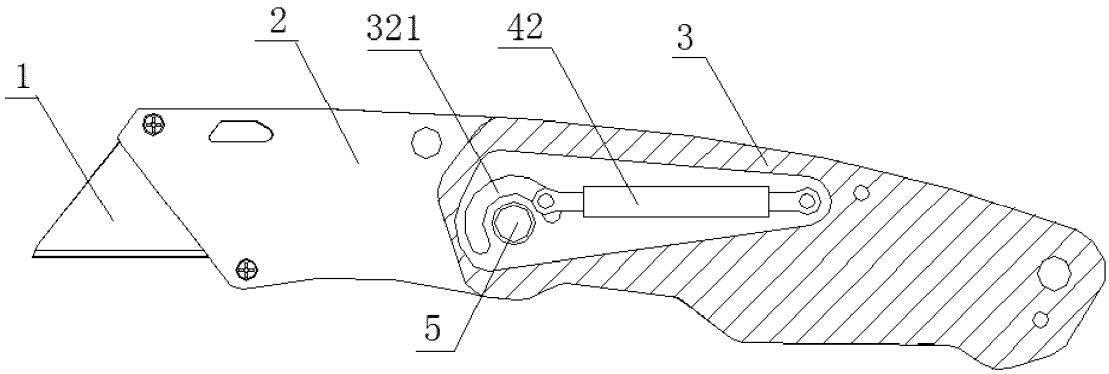

Fig. 12

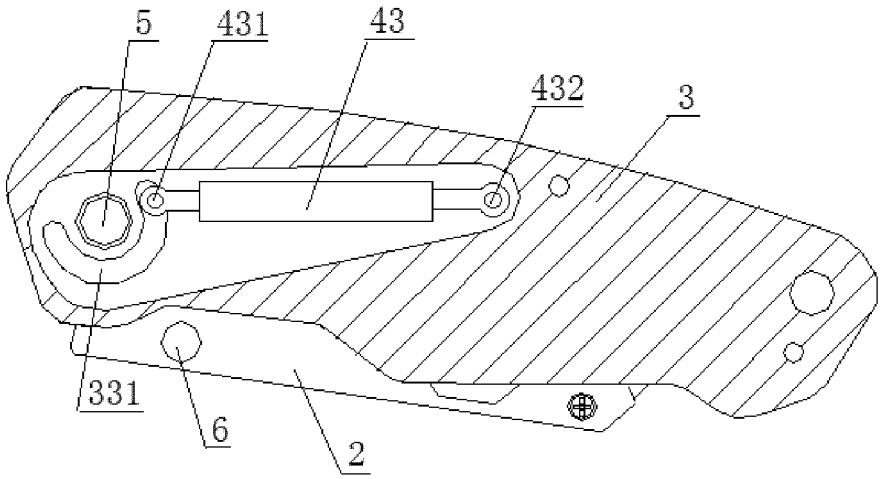

Fig. 13

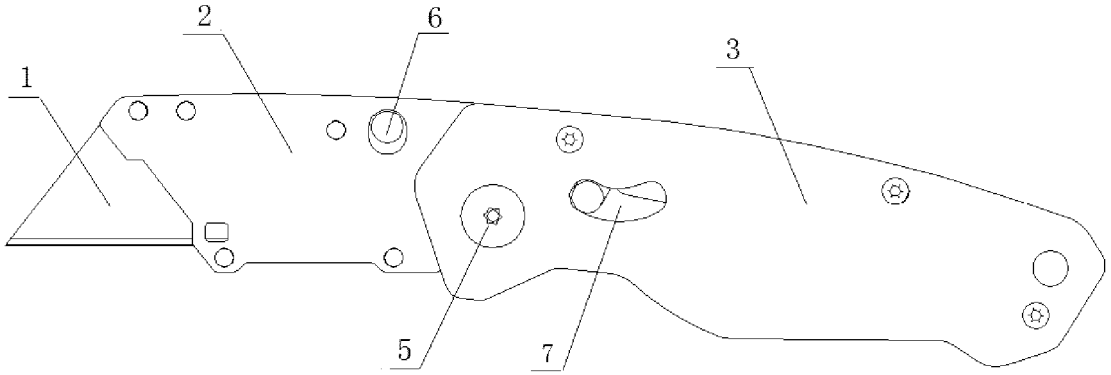

Fig. 14

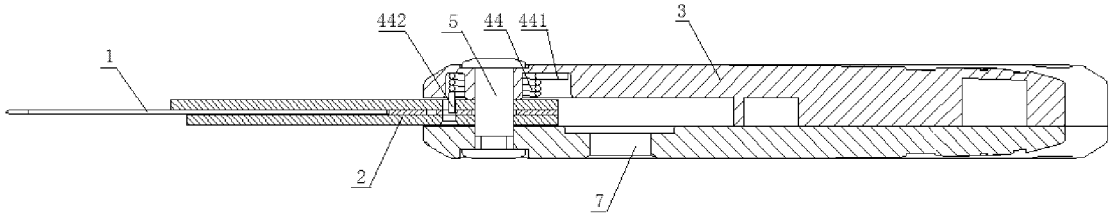

Fig. 15

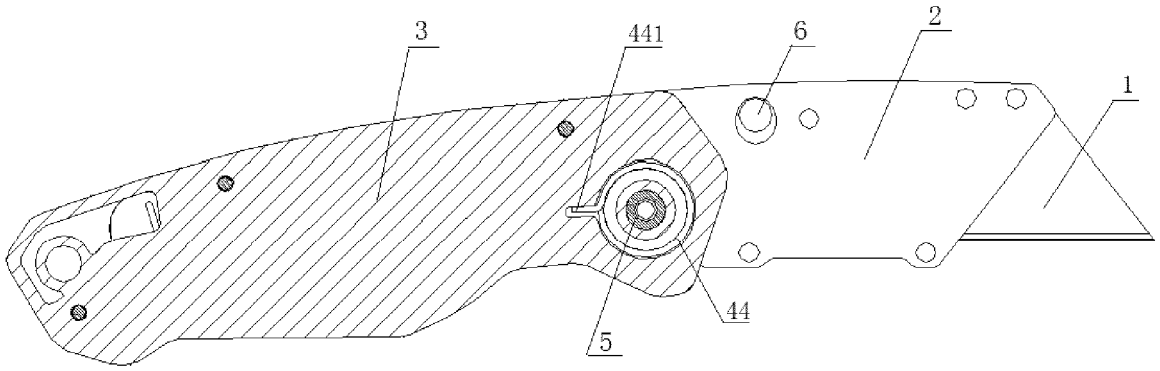

Fig. 16

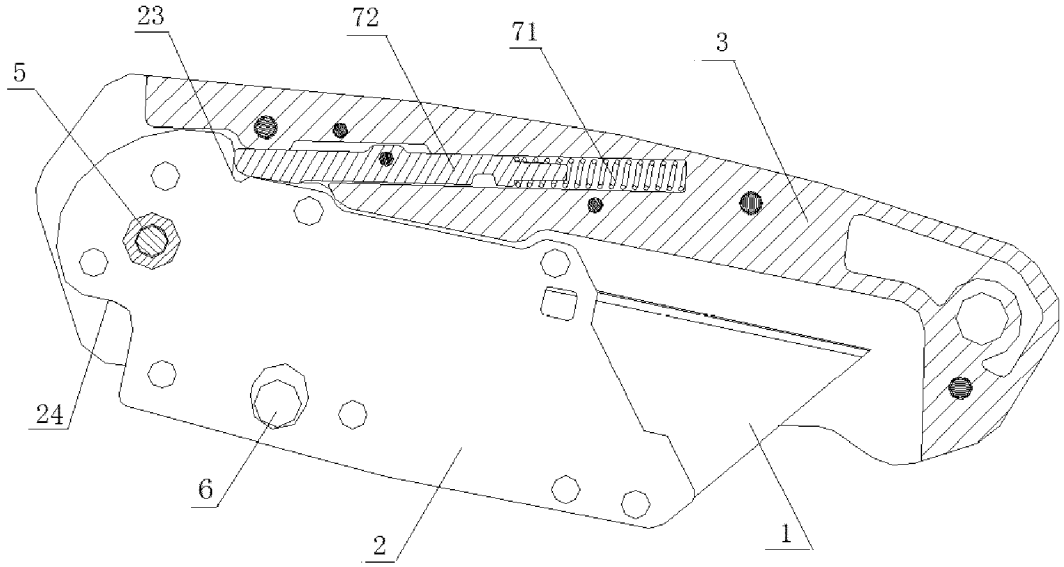

Fig. 17

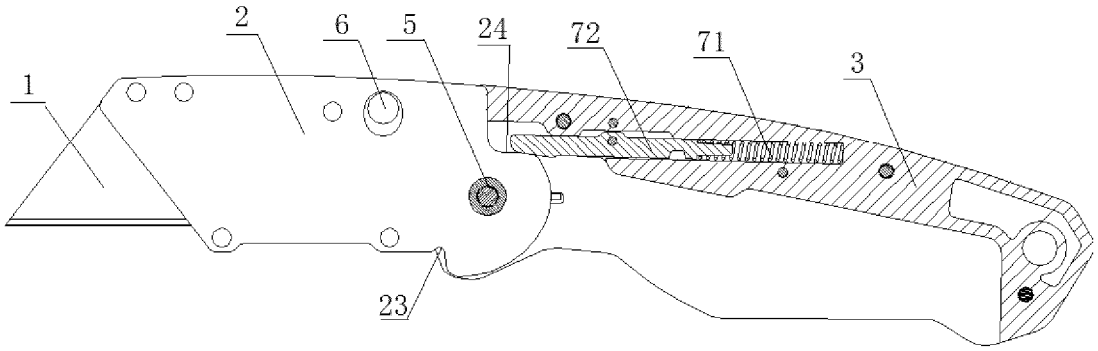

Fig. 18

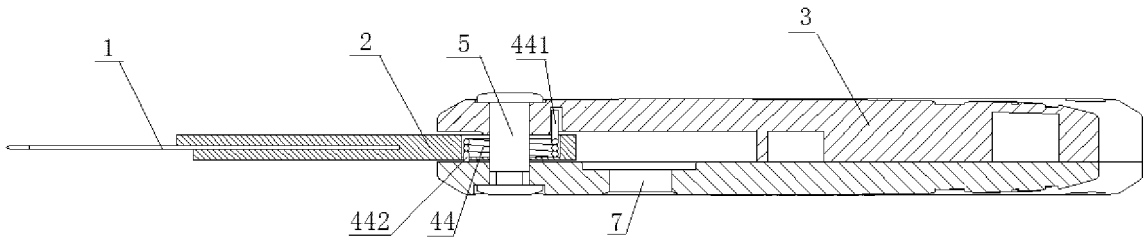

Fig. 19

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2015/071002

A. CLASSIFICATION OF SUBJECT MATTER

B26B 1/04 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B26B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CPRS, WPI, EPODOC, TWABS, CNKI: power-assisted, energizing, steel wire, fold, tool carrier, tool apron, blade bearing, toolholder, blade jaw, tension spring, pressure spring, torsional spring, fixation, keep, fold+ w knife, spring, lock???, slot, blade w carrier

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 201604158 U (SHANGHAI KUNJEK HANDTOOLS AND HARDWARE CO., LTD.), 13 October 2010 (13.10.2010), description, paragraph [0014], and figures 1-5	1-3, 8-17, 19-36
Y	US 6378214 B1 (KAI USA LTD.), 30 April 2002 (30.04.2002), description, column 5, line 28 to column 6, line 21, and figures 8 and 9	1-3, 8-17, 19-36
Y	US 6079106 A (VALL-I), 27 June 2000 (27.06.2000), description, column 2, line 6 to column 3, line 19, and figures 1-3	12-17, 19-21
Y	CN 1787896 A (BUCK KNIVES INC.), 14 June 2006 (14.06.2006), description, page 5, line 10 to page 9, line 15, and figures 2a-4b	22-36
Y	US 7941927 B1 (COLD STEEL), 17 May 2011 (17.05.2011), description, column 2, line 11 to column 3, line 19, and figures 1-4	30-36
A	CN 2506404 Y (CHENGSHUN ELECTRONIC SHANGHAI CO., LTD.), 21 August 2002 (21.08.2002), the whole document	1-36
E	CN 204585251 U (HANGZHOU GREATSTAR TOOL CO., LTD. et al.), 26 August 2015 (26.08.2015), claims 1-36	1-36

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 September 2015 (23.09.2015)	**28 October 2015 (28.10.2015)**
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer **LI, Juan** Telephone No.: (86-10) **62085469**

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2015/071002

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 201604158 U	13 October 2010	None	
US 6378214 B1	30 April 2002	None	
US 6079106 A	27 June 2000	None	
CN 1787896 A	14 June 2006	US 7107686 B2	19 September 2006
		WO 2004071250 A3	17 February 2005
		WO 2004071250 A2	26 August 2004
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		EP 1597026 A2	23 November 2005
		US 2004244205 A1	09 December 2004
US 7941927 B1	17 May 2011	None	
CN 2506404 Y	21 August 2002	None	
CN 204585251 U	26 August 2015	None	

Form PCT/ISA/210 (patent family annex) (July 2009)